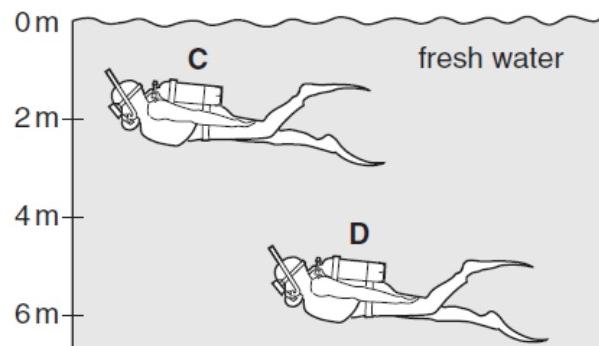
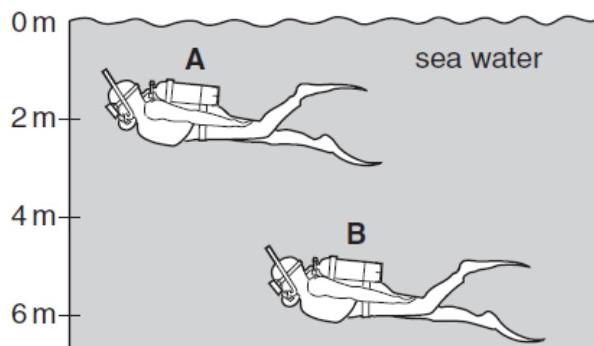


## Moment and pressure

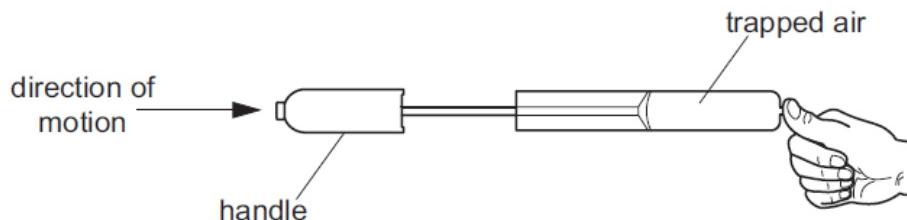
Choose one correct answer

- 1** The diagrams show two divers swimming in the sea and two divers swimming in fresh water. Sea water is more dense than fresh water.

On which diver is there the greatest pressure?



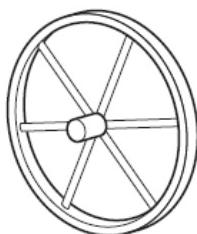
- 2** A student places his thumb firmly on the outlet of a bicycle pump, to stop the air coming out.



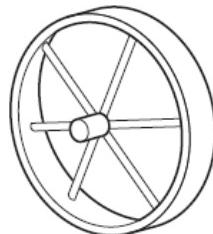
What happens to the pressure and to the volume of the trapped air as the pump handle is pushed in?

	pressure	volume
<b>A</b>	decreases	decreases
<b>B</b>	decreases	remains the same
<b>C</b>	increases	decreases
<b>D</b>	increases	remains the same

- 3 A farmer has two carts. The carts have the same weight, but one has four narrow wheels and the other has four wide wheels.



narrow wheel

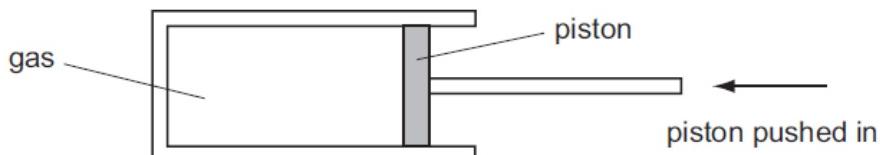


wide wheel

In rainy weather, which cart sinks **less** into soft ground, and why?

	cart wheels	why
A	narrow	greater pressure on the ground
B	narrow	less pressure on the ground
C	wide	greater pressure on the ground
D	wide	less pressure on the ground

- 4 A measured mass of gas is placed in a cylinder at atmospheric pressure and is then slowly compressed.

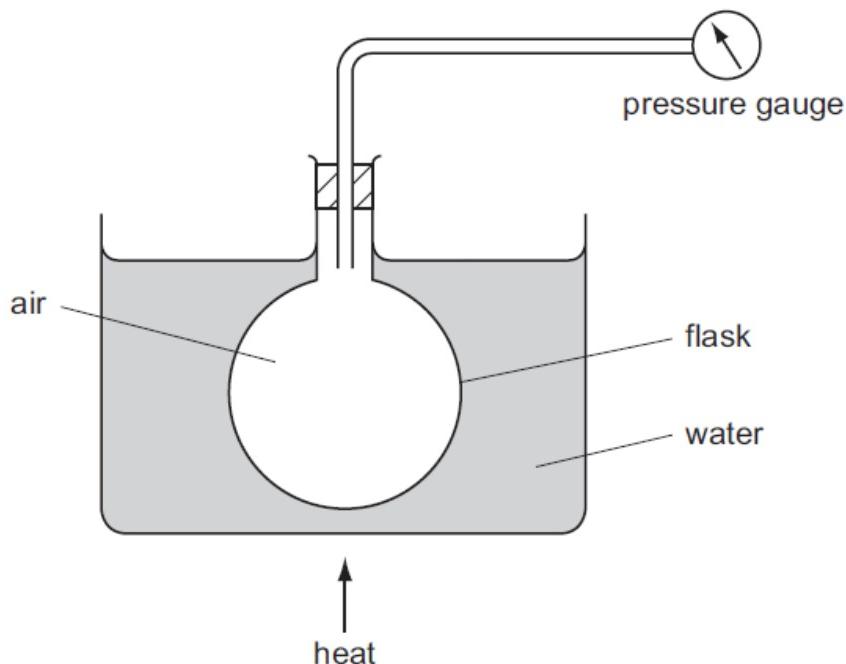


The temperature of the gas does not change.

What happens to the pressure of the gas?

- A It drops to zero.
- B It decreases, but not to zero.
- C It stays the same.
- D It increases.

- 5 An experiment is set up as shown.



What does the pressure gauge show as the air in the flask becomes hotter?

- A a steady pressure
  - B a decrease in pressure
  - C an increase in pressure
  - D an increase and then a decrease in pressure
- 6 Driving a car raises the temperature of the tyres.

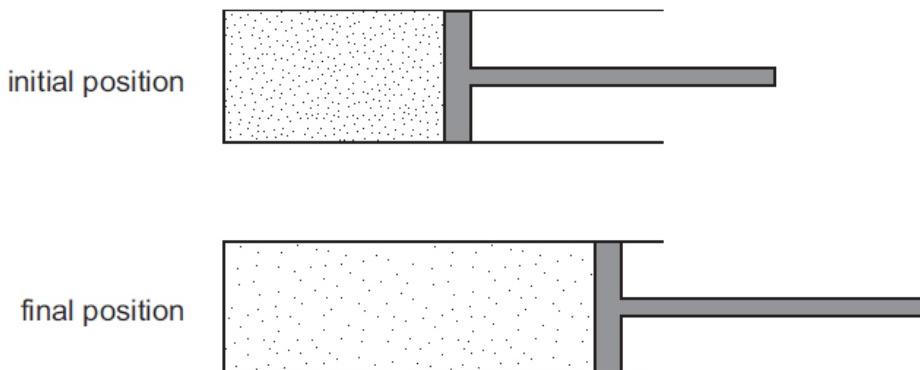
This causes the pressure of the air in the tyres to increase.

Why is this?

- A Air molecules break up to form separate atoms.
- B Air molecules expand with the rise in temperature.
- C The force between the air molecules increases.
- D The speed of the air molecules increases.

- 7 A piston traps a certain mass of gas inside a cylinder. Initially the piston is halfway along the length of the cylinder.

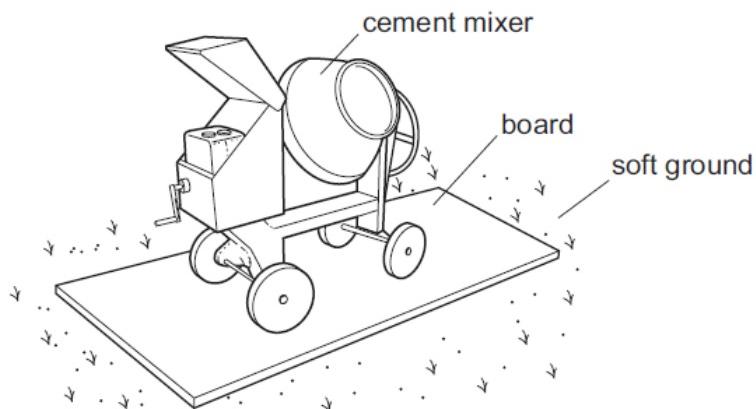
The piston is now moved towards the open end of the cylinder. The temperature of the gas remains constant.



How are the density and the pressure of the gas affected by moving the piston?

	density	pressure
A	decreases	decreases
B	decreases	unchanged
C	increases	decreases
D	increases	unchanged

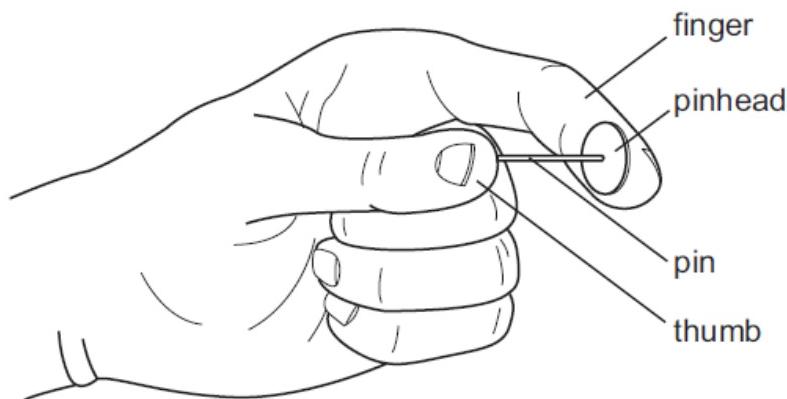
- 8 To prevent a cement mixer sinking into soft ground, the mixer is placed on a large flat board.



Why does this prevent the mixer sinking?

- A The large area decreases the pressure on the ground.
- B The large area increases the pressure on the ground.
- C The large area decreases the weight on the ground.
- D The large area increases the weight on the ground.

- 9 A pin is squeezed between finger and thumb.

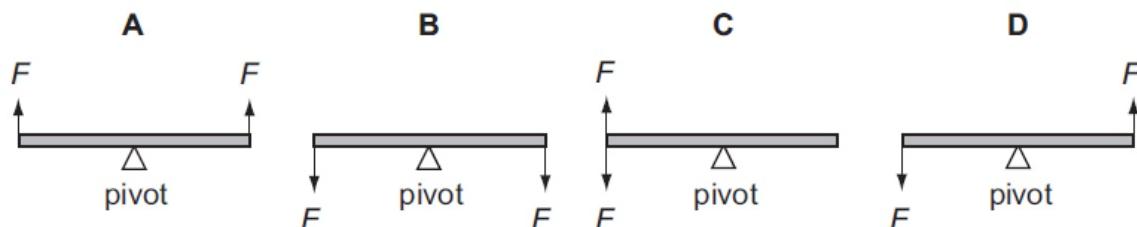


Which statement is correct?

- A The force of the pin is larger on the finger than on the thumb.
- B The force of the pin is larger on the thumb than on the finger.
- C The pressure of the pin is larger on the finger than on the thumb.
- D The pressure of the pin is larger on the thumb than on the finger.

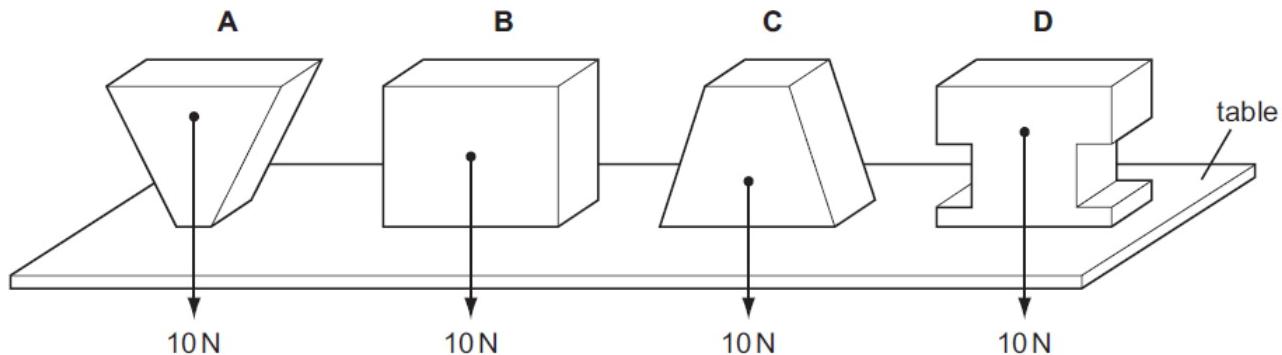
- 10 Two equal forces  $F$  act on each of four planks.

Which plank turns?



- 11** Four blocks, each weighing 10 N, rest on a horizontal table.

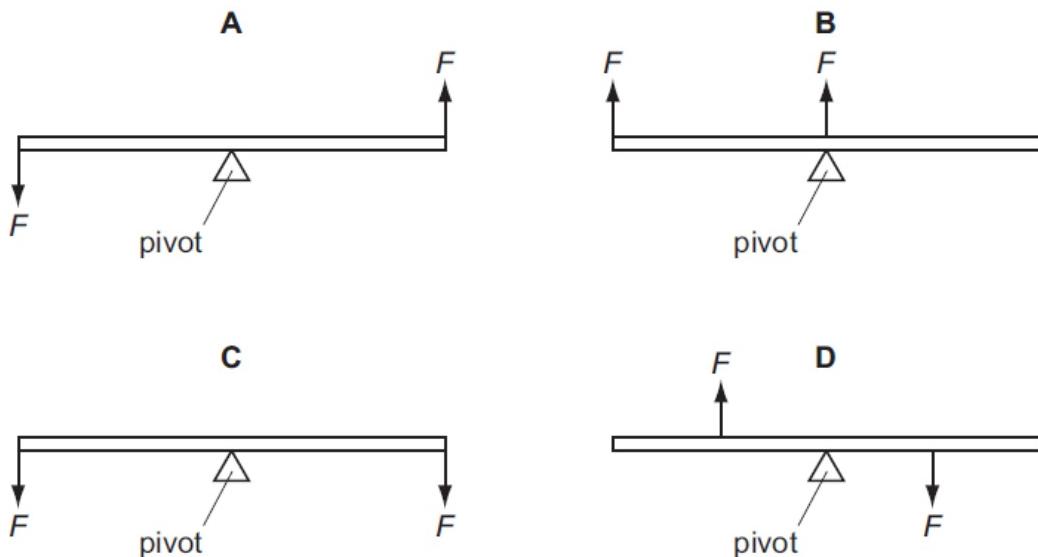
Which block applies the greatest pressure on the table?



- 12** The diagrams show a uniform rod with its midpoint on a pivot.

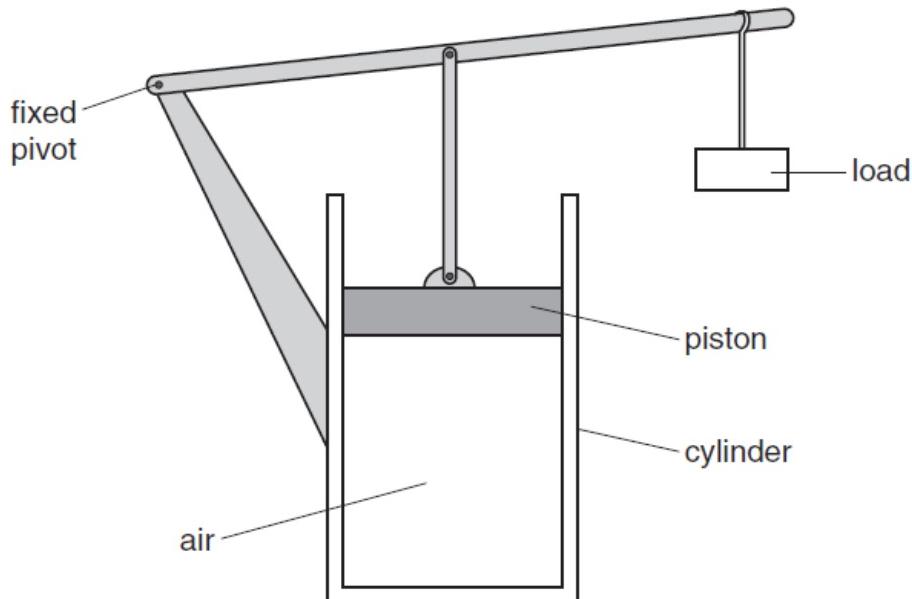
Two equal forces  $F$  are applied to the rod, as shown.

Which diagram shows the rod in equilibrium?



**Answer the following questions**

- 1** The air trapped in a cylinder by a piston is kept under pressure by a load, as shown in Fig. 4.1.



**Fig. 4.1**

- (a)** Describe how the pressure in the cylinder is caused by the air molecules.

.....  
.....  
.....

[3]

- (b)** The load is increased.

- (i)** State what happens to the piston.

.....

- (ii)** State what happens to the pressure in the cylinder, and give a reason.

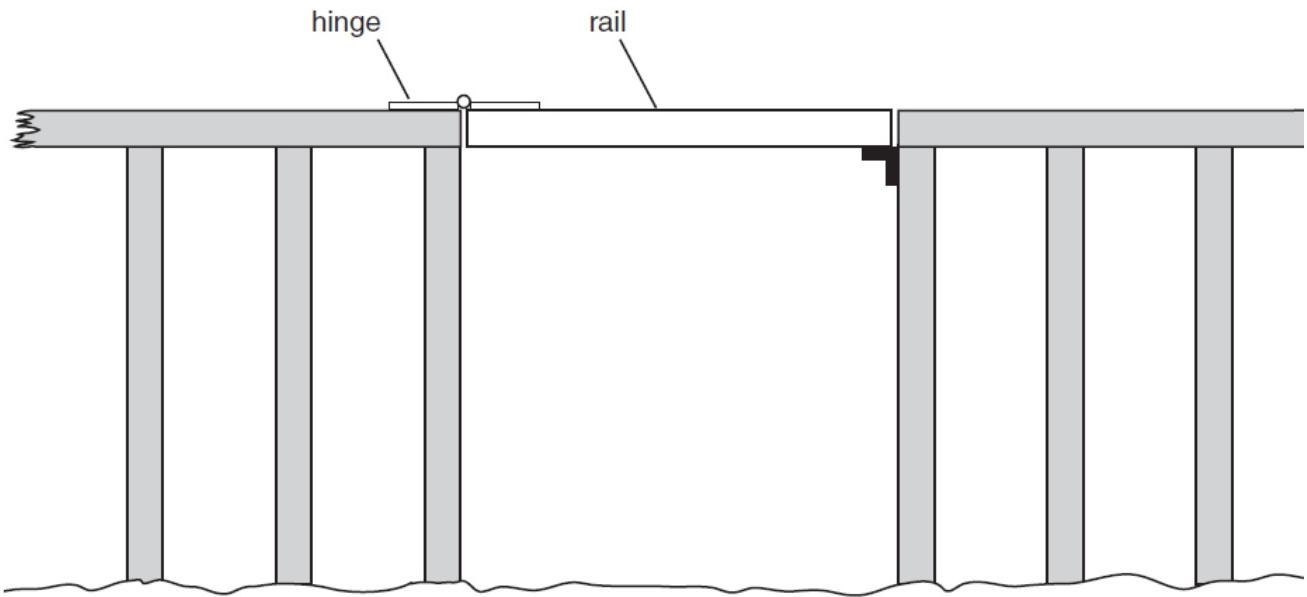
what happens .....

.....

reason .....

[3]

- 2 Fig. 2.1 shows a hinged rail in a fence. The rail has to be lifted vertically in order to let people through.



**Fig. 2.1**

- (a) On Fig. 2.1, draw an arrow to show the position and direction of the smallest force that would be needed to begin to raise the rail. [3]
- (b) What is the correct Physics term for the turning effect of a force?

Tick one box.

- |          |                          |
|----------|--------------------------|
| force    | <input type="checkbox"/> |
| work     | <input type="checkbox"/> |
| moment   | <input type="checkbox"/> |
| movement | <input type="checkbox"/> |

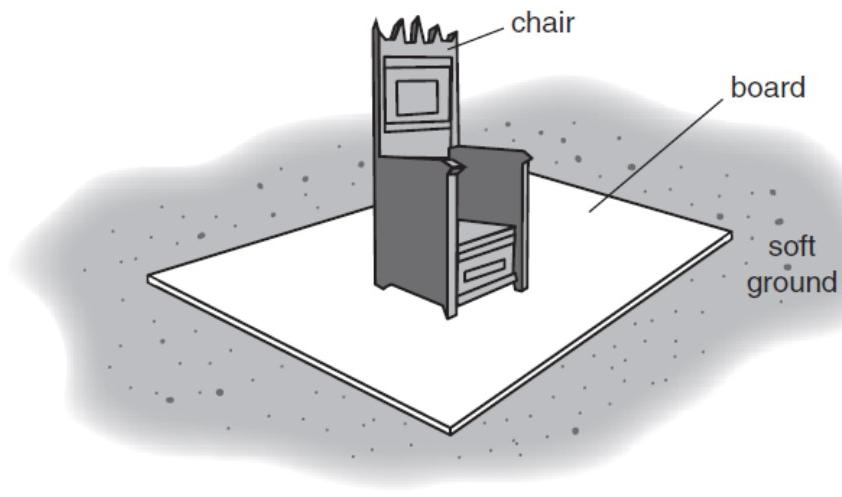
[1]

- (c) Suggest one way the designer of the fence could have reduced the force needed to lift the rail.

.....  
.....

[1]

- 3 (a)** For a special parade, the guest of honour is to sit on a chair whilst the parade passes by. Unfortunately the ground beneath the chair is soft, so the parade organisers put the chair on a large flat board, as shown in Fig. 1.1.



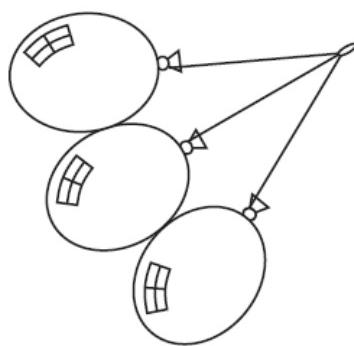
**Fig. 1.1**

Explain why the board prevents the chair from sinking into the ground.

.....

..... [2]

- (b)** At the parade, some air-filled balloons are used as decorations, as shown in Fig. 1.2.



**Fig. 1.2**

- (i)** State what happens to the balloons when the Sun makes them hotter.
- ..... [1]

- (ii)** In terms of molecules, explain your answer to (b)(i).
- .....
- ..... [2]

- (c) A pump is used to pump up the balloons in (b). A valve in the pump becomes blocked, as shown in Fig. 1.3.

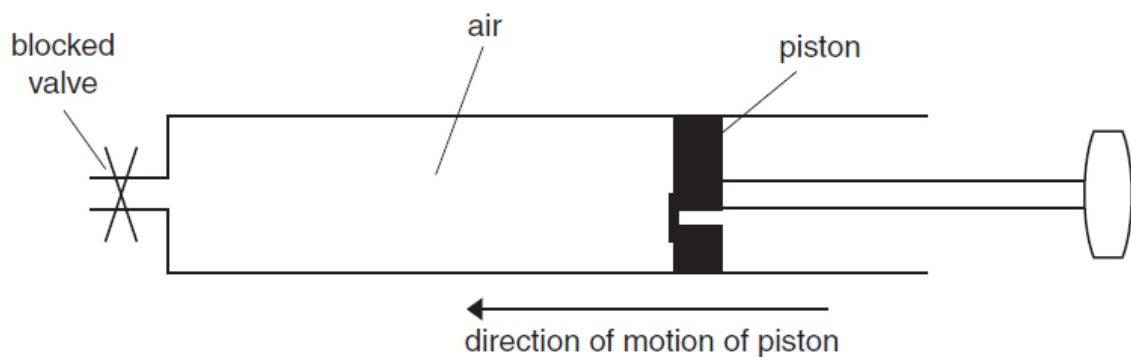


Fig. 1.3

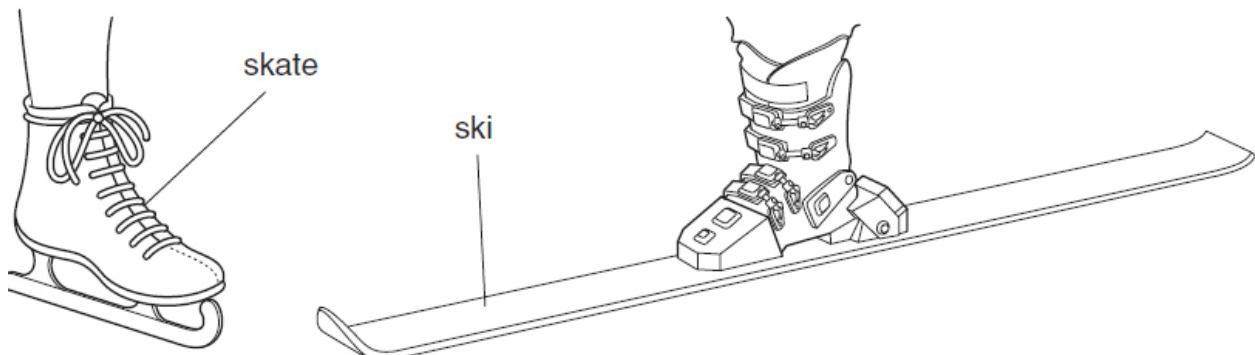
- (i) The piston of the pump is pushed in. State what happens to the pressure of the air trapped in the pump.

..... [1]

- (ii) In terms of molecules, explain your answer to (c)(i).

..... [3]

- 4 (a) Fig. 3.1 shows two examples of footwear being worn by people of equal weight at a Winter Olympics competition.



**Fig. 3.1**

Which footwear creates the greatest pressure below it, and why?

Which? .....

Why? ..... [2]